

gently upward and outward, so that *in situ* part of the dorsal branches and the first segments of the ninth legs are visible between them (Figs 22, 23). The shorter dorsal branches pass between the first segments of the ninth legs and their clavate ends rest on the caudal surface of these segments. Near their base, the ventral branches

pass closely around a medial knoblike protuberance that appears to be a sternal process:

*Length* about 15 mm.

*Type locality*.—Arkansas: Carroll County, Blue Spring; two males, October 29, 1949. The species has been collected at Fayetteville, Washington County, also.

**ICHTHYOLOGY.**—*Additions to the known fish fauna of Mexico: Three species and one subspecies from Sonora.* ROBERT RUSH MILLER and HOWARD ELLIOTT WINN, Museum of Zoology, University of Michigan.

During an ichthyological survey of the Gila River Basin of Arizona, New Mexico, and northern Mexico, in the spring of 1950, the writers made the first fish collections to be recorded from the San Pedro River in Mexico. This stream, once a permanent tributary to Gila River, originates near Cananea in northern Sonora, where peaks of the Cananea Range rise to over 8,000 feet. The surrounding country is open and extremely dry, however, and 15 miles distant, at San Pedro Ranch, the average annual rainfall for the period 1935–1949, inclusive, was only 12 inches (data kindly supplied by Nicholas Sherbakov, San Pedro Ranch). Four collections were made along the main river and in two of its tributaries in the vicinity of San Pedro Ranch, which lies on Río San Pedro about 8 miles south of the international boundary line. The elevation of the ranch is approximately 4,500 feet.

On September 10, 1943, James R. Simon investigated San Bernardino Creek, about 18 miles east of Douglas, Ariz. This stream rises about 2 miles north of the international boundary line and then flows south into Sonora, Mexico, eventually to join Río Yaqui. About 1 mile below the border he took a catfish and a sunfish that constitute new records for Mexico. Neither species is native to the Republic west of the Continental Divide.

The following species are recorded for the first time from Mexico; the specimens are deposited in the University of Michigan Museum of Zoology:

***Catostomus insignis* Baird and Girard**

The Gila coarse-scale sucker was fairly common just above the ranch of Don Rafael Elias,

about 6 miles southwest of San Pedro Ranch, where 13 half-grown and 3 large adults (68–112 and 264–290 mm in standard length) were secured; only one half-grown (114 mm), seined at night, was taken above the large rock dam 2 to 3 miles west of Elias Ranch. Both localities are on a tributary to Río San Pedro, called locally Río San Rafael, which joins the main river about 4 miles upstream from San Pedro Ranch. The specimens were collected by the authors and Frances H. Miller on April 21–22, 1950. One large female extruded ripe eggs under slight pressure, indicating that spawning was imminent or in progress. The water was 73°F., the air 85°F. at 3 p. m.

***Tiaroga cobitis* Girard**

The loach minnow was taken on April 22 in Río San Pedro, at its junction with Río San Rafael, about 4 miles south of San Pedro Ranch. Only 4 adults (37 to 48 mm long), from two rocky riffles, were secured. One riffle was about 25 feet long and formed three rivulets each 1 to 2 feet wide and about 2.5 inches deep. The other riffle, which lay at the head of an undercut pool, was about 8 feet long, up to 4 inches deep, and 2 to 3 feet wide. A long, shallow sandy stretch of approximately 140 feet lay between. The rocks were covered with a short growth of dense green algae and the river was entirely exposed to the bright sun. By using derris root, we obtained this meager sample of a species which undoubtedly was common in the Mexican portion of this river before its flow had become so drastically reduced.

***Ameiurus melas* (Rafinesque)**

Black bullheads were abundant along Río San Rafael, just above the ranch of Don Rafael Elias and in the large reservoir 2 to 3 miles to

the west. From one pool 25 feet long, 3 to 12 feet wide and with a maximum depth of about  $4\frac{1}{2}$  feet, well over 125 catfish, mostly young, were caught and discarded. This pool was cut off by a gravel bar from the main stream, about 5 feet away, and was maintained by a spring seepage at its upper end. In the reservoir this species is much fished for by the natives. The largest specimen we took there weighed 16 ounces. *Ameiurus melas* evidently was introduced at an early date for local testimony indicated that these catfish were here in 1906.

The above material appears to represent the form currently called *A. m. melas* (Rafinesque), the northern black bullhead, for it typically has shorter spines, a heavier body, and perhaps fewer (18 to 21, usually 19 or 20) anal rays than the southwestern subspecies.

The southwestern black bullhead, *Ameiurus melas catulus* (Girard), was seined by J. R. Simon from San Bernardino Creek, 1 mile below the United States border, on September 10, 1943 (3 young to adult, 57-151 mm long). The same subspecies was caught on April 8, 1944, in a pond that lies  $\frac{1}{4}$  mile below the border and a short distance west of San Bernardino Creek (5 adults, 119-209 mm long), by Marvin Frost and John Hendrickson. The anal ray counts of these 8 fish are 20(3), 21(3), and 22(2); the specimens with 20 rays have the elongate dorsal and pectoral spines that are believed to characterize this subspecies.

Two other species, which certainly once inhabited Río San Pedro in Mexico, were not seen by us although we did not work the drainage exhaustively. They may still survive in Mexico or, if not, they may return to this section of the river when (and if) more favorable water conditions prevail again; both species still occur north of the United States-Mexico boundary line in the Arizona portion of Río San Pedro. These two species are: *Pantosteus clarki* (Baird and Girard), the Gila mountain sucker, and *Meda fulgida* Girard, the scaleless spinedace.

#### *Lepomis macrochirus purpurescens* Cope

The southeastern bluegill is represented by 3 adults (102 to 105 mm long) taken by minnow seine in San Bernardino Creek, 1 mile south of the United States border, in water up to 4 feet deep. The broad and comparatively few vertical bars and the 12 anal rays of each specimen confirm the reference to this subspecies, which ranges from Florida north to North Carolina. A southwestern form, *Lepomis macrochirus speciosus* (Baird and Girard) is native to western Texas and tributaries of Río Grande in northeastern Mexico. In this subspecies, the modal number of anal rays is 10 and the dark bars are narrower and more numerous, as in *L. m. macrochirus*. Evidence that *purpurescens* is being (or has been) distributed was obtained by Carl L. Hubbs on June 22, 1938, when he visited the Federal hatchery at San Marcos, Tex. There he saw and obtained (U. M. M. Z. no. 120240) specimens of this subspecies, introduced four years earlier from the Federal hatchery at Lake Park, Ga., which was being reared and hatched at San Marcos for transplantation. In life the soft parts of the posterior fins, particularly the anal, are reddish on the half-grown. This fish, called locally "Georgia bluegill," was being stocked in preference to the native subspecies because it was said to grow faster and take artificial food better. Perhaps the San Marcos hatchery was the source for the sample taken in Sonora, Mexico.

Although we worked San Bernardino Creek from the international line to approximately 2 miles below the border, this species was neither seen nor collected by us on April 24, 1950. The creek was very low, however (almost completely dry in the United States), and the population of bluegills sampled by Simon either may have vanished or may now survive only in the lower portion of San Bernardino Creek where water was reported to be still abundant.